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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/888,631	06/20/2001	John D. Olivas	NPO-20148-2-CU	9127

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EXAMINER

DIAZ, JOSE R

ART UNIT PAPER NUMBER

2815

DATE MAILED: 03/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/888,631

Applicant(s)

OLIVAS, JOHN D.

Examiner

José R Díaz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 24 November 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 6-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 6-10 and 12-19 is/are rejected.
- 7) ☒ Claim(s) 11 and 20-23 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Drawings*

1. The drawings were received on November 24, 2003. These drawings are acceptable.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 6, 7 and 12-19 are still rejected under 35 U.S.C. 102(b) as being anticipated by Joachim et al. ("A Nanoscale Single-Molecule Amplifier and Its Consequences", Proceedings of the IEEE, Vol. 86, No. 1, January 1998, pages 184-190).

Regarding claims 6, 7 and 12-16, Joachim et al. teaches a MEMS device comprising a piezoelectric element (PZT) connected to an end of the tunneling tip (Tip), a conductive surface or diaphragms (Surface) and a carbon-based protective padding or spacer layer (C<sub>60</sub>) (see Figs. 2-3) comprising a film of fullerene C<sub>60</sub> nm (see Figs. 2-3) having a thickness of one molecule or about 1 nm (see second sentence in abstract on page 184, and second sentence in section IV on page 188), said film (C<sub>60</sub>) located at

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the conducting surface (Surface) between the tunneling tip (Tip) and the conductive surface (Surface) (see Figs. 2-3).

Regarding claims 17-19, Joachim et al. teaches applying energy to the substrate ("bias voltage") (see fig. 2 and second paragraph of Section III on page 186).

4. Claims 6-10 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by IBM Corp. ("Molecular Brush Assembly", IBM Technical Disclosure Bulletin, Vol. 37, No. 1, January 1994, pages 261-262).

Regarding claims 6 and 7, IBM Corp. teaches a MEMS device comprising a STM or FM tunneling tip (3), a conductive surface or diaphragms (2) and a carbon-based protective padding or spacer layer (1) (see Fig. 3) comprising a film of fullerene C<sub>60</sub> having a thickness of one molecule (see page 261, last paragraph), said film (1) located at the conducting surface (2) between the tunneling tip (1) and the conductive surface (2) (see Fig. 3).

Regarding claim 8, IBM Corp. teaches that the conductive surface includes gold (see page 261, first paragraph).

Furthermore, with regards to the deposition processes recited in claims 9 and 10, Applicant should note that such limitations contain method of making characteristics given no patentable weight in determining patentability of the final device structure. Note that a "product by process" claim is directed to the product per se, no matter how actually made, In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); In re Marosi et al, 218 USPQ 289; and particularly In re Thorpe, 227 USPQ 964, all of which make it clear that it is the

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patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear.

5. Claims 6 and 7 are still rejected under 35 U.S.C. 102(e) as being anticipated by Gimzewski et al. (US Pat. No. 5,897,954).

Regarding claims 6 and 7, Gimzewski et al. teaches a MEMS device comprising a STM tunneling tip (33), a conductive surface or diaphragms (30, 31) and a carbon-based protective padding or spacer layer (32) (see Fig. 3) comprising a film of fullerene C<sub>60</sub> having a thickness of one molecule (see col. 4, lines 39-41), said film (32) located at the conducting surface (30, 31) between the tunneling tip (33) and the conductive surface (30, 31) (see Fig. 3).

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 8-10 are still rejected under 35 U.S.C. 103(a) as being unpatentable over Joachim et al. ("A Nanoscale Single-Molecule Amplifier and Its Consequences",

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Proceedings of the IEEE, Vol. 86, No. 1, January 1998, pages 184-190) in view of Applicant's Specification.

Regarding claim 8, Joachim et al. teaches the use of copper as the conductive surface (see Fig. 2(a)). However, Joachim et al. is silent with respect to the use of gold. Applicant acknowledges that it is well known in the art to use gold as a conductive surface for a C<sub>60</sub> film (see page 2, lines 18-20). Joachim et al. and Applicant's admitted prior art are analogous art because they are from the same field of endeavor as applicant's invention. At the time of the invention it would have been obvious to a person of ordinary skill in the art to provide a C<sub>60</sub> film over a gold conductive surface. The motivation for doing so, as is taught by applicant, is to improve the conductivity of the device (page 2, lines 19-20: "gold's passive characteristics"). Therefore, it would have been obvious to combine Joachim et al. with Applicant's Specification to obtain the invention of claim 8.

Regarding claims 9 and 10, Joachim et al., as stated before, teaches a MEMS device with a film of fullerene C<sub>60</sub> formed between the tunneling tip and the conductive surface (see above). With regards to the deposition processes recited in claims 9 and 10, Applicant should note that such limitations contain method of making characteristics given no patentable weight in determining patentability of the final device structure. Note that a "product by process" claim is directed to the product per se, no matter how actually made, *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); *In re Marosi et al*, 218 USPQ 289; and particularly *In re Thorpe*, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by

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process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear.

### ***Allowable Subject Matter***

8. Claims 11 and 20-23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter: the prior art fails to teach, disclose, or suggest, either alone or in combination, a MEMS device comprising a single event pipe containing a gas that reacts with carbon byproducts, and a removable fullerene spacer layer between a conductive surface and a tunneling tip.

### ***Response to Arguments***

10. Applicant's arguments filed November 24, 2003 have been fully considered but they are not persuasive. Applicant argued that the references Joachim, IBM, and Gimzewski are not analogous art since the fullerene disclosed by such references is not used as a spacing element (see remarks). However, the examiner disagrees. The references Joachim, IBM, and Gimzewski do teach an analogous structure in which a conductive tip is spaced apart from a conductive surface by interposing fullerene ( $C_{60}$ ) between the conductive tip and the conductive surface (see figures 2 and 3 of Joachim, figures 3 of IBM, and figure 3 of Gimzewski). Thus, the interposed fullerene ( $C_{60}$ ) is in

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fact a "spacing element" as stated in Applicant's remarks and it also a "spacer layer" as recited in claims 6, 12 and 13. Moreover, with regards to Applicant's arguments relating to the purpose of fullerene as "a spacing layer", it is noted that the structure disclosed by the references satisfy the structural limitations recited in the claims. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex Parte Masham*, 2 USPQ F.2d 1647 (1987). Therefore, the rejection is considered to be proper.

### ***Conclusion***

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.



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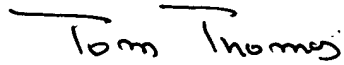
***Correspondence***

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to José R Díaz whose telephone number is (571) 272-1727. The examiner can normally be reached on 9:00-5:00 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JRD  
2/26/04

  
Tom Thomas  
Patent Examiner  
Art Unit 2815  
2/26/2004